

# MEDICAL CASE STUDY: HEPATECTOMY IN CIRRHOTIC PATIENT WITH HEPATOCELLULAR CARCINOMA

## Initial Contact

In February 2020, the University of Arkansas for Medical Sciences (UAMS) Division of Gastroenterology and Hepatology referred a 60-year-old man to **Emmanouil Giorgakis, M.D.**, a transplant and hepatobiliary surgeon at UAMS, for the management of a tumor measuring 2.5 by 2.7 centimeters in the right posterior segments of his liver. The tumor was identified on an MRI performed during routine surveillance of the patient because of his history of cirrhosis stemming from chronic Hepatitis C infection. Biopsy of the liver lesion confirmed it was a well-differentiated hepatocellular carcinoma (HCC).

## Assessment

A liver transplant would treat the patient's cirrhosis while also removing the tumor. However, Giorgakis said the patient didn't qualify for a liver transplant at that time.

For non-transplant candidates with HCC, the next-best option is liver resection, also known as hepatectomy, to remove only the tumorous part of the liver.

Cirrhotic patients are at high risk of death during major abdominal surgery other than liver transplant. Therefore, the patient underwent further workup to determine if he would be able to tolerate major liver resection. This workup included assessment for significant portal hypertension and estimation of postoperative mortality risk. The patient was deemed a surgical candidate.

Next, Giorgakis had to assess whether, if the tumor was removed, the patient would have enough liver volume left behind to sustain him. On non-cirrhotic patients, the liver can regenerate even if up to 70% of it is removed, but a cirrhotic liver's

ability to regenerate is compromised. Giorgakis said that for cirrhotic patients, resection of even a small volume can lead to liver failure, the primary cause of death during surgery on such patients.

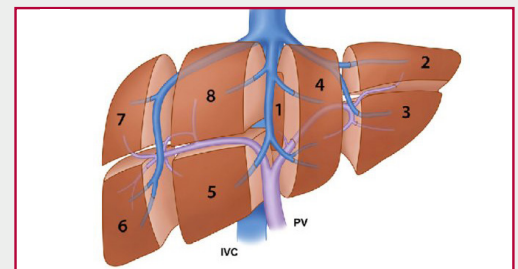
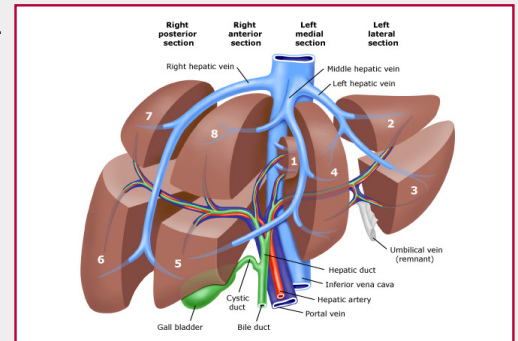
## Procedure

To prepare the patient for surgery, Giorgakis referred the patient to **James M. Meek, D.O.**, an interventional radiologist at UAMS, for a transarterial radioembolization (TARE) procedure, to be followed by Giorgakis' evaluation several weeks later of the liver's response to the treatment.

**Meek and Erin Priddy, M.D.**, both in the UAMS Division of Interventional Radiology (IR) at UAMS, perform most of the TARE procedures, also known as Y-90 (yttrium radiation) procedures, at UAMS Health. The division is the largest provider in the South of such treatments for liver-cancer patients. In the procedure, Meek placed a small catheter into the artery leading to the patient's liver and then injected microscopic beads filled with the radioactive isotope Y-90, to deliver radiation treatment directly to the tumor to kill the tumor cells but spare the rest of the liver.

The TARE procedure also blocked oxygen from reaching the radiated portion of the liver intended for resection, thereby priming the future liver remnant to sense that part of it was missing and compensate by using its regenerative capacity to enlarge.

Giorgakis and Meek monitored the patient for two or three months to gauge how the liver remnant responded to the stress of the TARE procedure, and then performed a computed tomography (CT) volumetric test. They said the patient's liver didn't grow at the rate



Illustrations indicating the different sections of the liver.

that a non-cirrhotic liver would, but did hypertrophy enough to move forward with the surgery.

In May 2020, Giorgakis performed a modified right hepatectomy — a partial resection of the right lobe of the liver. The patient stayed at the hospital for five days and was discharged with no problems and no signs of liver failure.

"He's been well," Giorgakis reported nearly two and a half years later. "And since then, since we treated his Hepatitis C as well, he went back to HCC surveillance. For two years, he underwent MRIs every three months. After that, the surveillance drops to every six months, and finally, yearly."

While there is up to a 50% chance of recurrence within five years without a transplant, the patient has had no signs of recurrence, Giorgakis said.

## Discussion

HCC is the most common type of primary liver cancer. Left untreated, a patient's life expectancy is six to 20 months, and the five-year survival rate is only 10%.

On cirrhotic patients with HCC, liver transplant offers an 80% five-year survival rate with a very low (15%) risk of disease recurrence, since the surgeon removes the cirrhotic liver within which tumors can regenerate, while also treating the end-stage liver disease.

“What’s important with these HCC cirrhotic patients is that they have high cancer recurrence risk while they are also at or nearing end-stage liver disease; and therefore, whenever they are eligible, they should be offered the transplant opportunity or the possibility to bridge a less invasive treatment to transplant in the event of hepatic decompensation or tumor recurrence,” Giorgakis said. “On those patients who aren’t eligible for transplant,

the best chance for survival is resection after appropriate ‘priming’ of the future liver remnant, in specialized centers. The mortality risk from doing liver resections on cirrhotic patients is otherwise very high.”

“It’s important that these cases are done in centers that can offer liver transplant if needed and have an interventional radiology department experienced in advanced procedures such as TARE or portal venous embolization (PVE),” Giorgakis said.

**UAMS is the only center offering adult liver and kidney transplants in the State. Besides transplants, UAMS hepatobiliary and transplant surgeons also perform 70 to 100 liver resections annually.**

### Emmanouil Giorgakis, M.D., MSc, FRCS, FACS



Assistant Professor  
Department of Surgery - Transplantation

#### Education

Doctor of Medicine, National & Kapodistrian University of Athens, Greece

#### Residency

National Health Service Hospitals, United Kingdom  
Albert Einstein College of Medicine, New York  
Rhodes General Hospital in Rhodes, Greece

#### Fellowship

Multi-organ abdominal transplant surgery, Mayo Clinic, Phoenix, Arizona  
Liver transplant, King’s College Hospital, London

### James Meek, D.O.



Associate Professor  
Department of Radiology

#### Education

Doctor of Osteopathic Medicine, University of North Texas Health Science Center, Fort Worth, Texas.

#### Residency

Diagnostic radiology, UAMS

#### Fellowship

Vascular interventional radiology, UAMS

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